

REMARKS

Applicant's attorney thanks the Examiner for the careful consideration given to this application. The matters raised in the Office action are discussed below in the same order as presented by the Examiner.

The present invention is based in-part on applicant's discovery that the spun-bonding tower apparatus is preferably separated from the consolidation apparatus in order to improve the effectiveness of consolidation and the maintenance of balanced properties. More particularly, the apparatus separation, including the use of a less air-permeable conveying element in the consolidation step, provides increased filament entanglement to thereby better preserve the ratio of tensile strength in the length direction to the tensile strength in the breath direction as well as the absolute values of tensile strength achieved. These improvements are shown in the accompanying Declaration of Emilie Pleyber which is made a part of this response.

Initially, it is noted that all the claims have been amended to use idiomatic English and to better conform them to US practice. As further explained below, the claims have also been amended to better emphasize the improvements of the present invention and more clearly distinguish the

same over the prior art. Newly presented claims 14-16 are within the elected Group II, and they should be examined in this application.

Claim 4 has been amended to include the subject matter of claim 6, specifying that the first conveyor is more air-permeable than the first movable conveying element.

Also, claim 4 has been amended to clarify that the first conveyor and the first movable conveying element each include in an elongate generally flat run along which the mat is conveyed and supported. These features are particularly supported by the drawings and the description thereof in the application.

Claim 6 also provides that the consolidation means include fluid impingement of the mat which cooperates with the lesser air-permeability of the first movable conveying element to enhance filament entanglement, consolidation and preservation of the ratio of the tensile strength in the length direction to the tensile strength in the breadth direction. The preservation of the ratio is discussed at page 1, lines 22 - 26 and page 2, lines 12 - 15 and lines 22 - 25 of the application as well as in prior claim 12.

Newly presented claim 14 is similar to claim 4 and provides that the first conveyor is more air-permeable than

the first movable conveying element. As in claim 4, it is also recited that each of the first conveyor and the first movable conveying element includes "an elongate generally flat run along which the mat is conveyed and supported".

Further, claim 14 provides that the improved support of the mat during consolidation on the first movable conveying element improves entanglement, and thereby enhances consolidation and preservation of the ratio of the tensile strength in the length direction to the tensile strength in the breath direction as compared with the corresponding ratio provided by an identical consolidation of an identical mat on the first conveyor. The improved consolidation is particularly discussed in the sentence bridging pages 1 and 2 of the application.

Claim 15 emphasizes the increases in tensile strength resulting from the improved entanglement of the filaments due to the reduced air-permeability of the first movable conveying element.

Claim 16 provides that the second conveying element linear speed is less than the conveyor linear speed. This speed relationship tends to inhibit stretching of the mat, preferentially increased tensile strength in the long direction and an unbalanced tensile ratio.

The rejection of claims 4 - 13 under 35 USC 112, second paragraph, has been overcome by amendment. This is discussed below in detail.

With regard to the matter mentioned under subparagraph (a), the phrase "the mat being delivered on a first movable conveying element to means for consolidation by entanglement" is no longer contained in any of the claims. Claim 4 has been particularly amended to use idiomatic English and conformed to US claim style. Independent claim 14 is similar to claim 4.

With regard to the recitation of "means" in prior claims 10 and 11, this recitation has been uniformly amended in all claims to read -transfer means- in order to more clearly distinguish the recitation of the same in the claims. For the Examiner's convenience, it is noted that the first movable conveying element suction device is element 7 in the application and drawings.

The rejection of claims 4 - 5 and 10 - 12 under 35 USC 103(a) as being unpatentable over US 5768756 to Noelle ("Noelle") in view of US 6050469 to Brabant et al. ("Brabant") and further in view of US 2002/0168910 to Vuillaume et al. ("Vuillaume") is overcome by amendment. The combined references do not teach or suggest the invention as now set forth in the claims.

Initially, it is noted that the mat is free of prior consolidation as delivered to the first movable conveying element. This is not true in Noelle since the mat 10 is delivered to the first conveyor 1 without support so as to indicate prior consolidation. This is also true in Brabant for the same reason. In Vuillaume the mat is consolidated between rolls 8 and 10 prior to being passed to a further conveyor.

Claim 4 also provides that the first conveyor and the first movable conveying element each include an elongate generally flat run along which the mat is conveyed and supported. In this manner, support of the mat without consolidation is provided along the first conveyor and the mat, without prior consolidation, is more effectively consolidated as it is supported on the first movable conveying element. None of the cited prior art patents teach conveying the mat prior to consolidation from a first flat conveyor run to a second flat conveyor run.

Further, none of the patents teach that the mat should be transferred from a first conveyor to a less air-permeable first movable conveying element. As shown by the data in the Pleyber declaration, transfer of a previously non-consolidated mat to a less air-permeable first movable conveying element followed by consolidation on the first

movable conveying element yields improved preservation of the ratio of tensile strengths between length and breadth directions as well as increased absolute values. In this regard, the data in the declaration shows that the ratio is improved from 1.41 to 1.40, and that the absolute tensile values are increased by a factor of about 1.4. That is, the tensile values in each direction are uniformly improved by about 140%. Such improvement is wholly unexpected especially when it is achieved in both directions so as to preserve the tensile ratio.

The rejection of claims 6 - 9 under 35 USC 103(a) as being unpatentable over Noelle, Brabant, and Vuillaume as applied above, and further in view of US 6663373 B2 to Yoshida ("Yoshida") is also overcome by claim amendment. Yoshida is particularly cited for its teaching of an air-permeable belt 3 which receives filaments from the spin nozzles 4.

Yoshida uses the belt 3 to assure that a negative pressure is maintained under the hood 8 in order to assist in the stretching of the filaments as they pass from spin nozzles 4. Yoshida provides no teachings in respect to the relative air-permeability of the belt 3 with respect to any other belt or conveyor. In the action, it is stated:

"Absent evidence of unexpected results obtained from using the claimed apparatus air-permeabilities, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected a suitable apparatus air-permeabilities to effectively create the needed suction, the apparatus air-permeabilities being a result effective variable routinely optimized by those of skill in the art."

The foregoing observation is relevant to the stretching of the filaments only, and has nothing to do with the claimed invention as it relates to consolidation and preserving the ratio of tensile strength values. As stated in Section 2144.05 II B of the MPEP,

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy)."

Herein, the stretching variables have nothing to do with the consolidation of the invention. Therefore, optimization based on stretching variables will not provide the consolidation and ratio preservation of the invention.

In a like manner, the further observations in the action relative to optimization of a range or other

variable are not tied to the features of the present invention or otherwise related by any prior art teaching to such features. Accordingly, these observations are not relevant to the claimed air-permeabilities. Moreover, they are not relevant to the premises of the basic invention based upon separation of spinning apparatus and compaction apparatus with the latter providing a less air permeable support for the initial compaction of the mat.

The relationship between the air-permeability of a belt and the suction applied to such belt as discussed in detail in the action is not relevant to the claimed invention. In fact, these considerations are only of interest in a hindsight re-creation of the present invention. The application of suction to an air-permeable belt has no relevance to the present invention.

In the course of these comments, it is correctly noted that the achievement of unexpected results will patentably distinguish the present invention over the prior art. The Pleyber declaration provides such evidence. Again, it is emphasized that the testing therein shows that the tensile ratio is preserved while achieving 140% increase in tensile values in accordance with the claimed invention. Such an increase in tensile values while preserving, if not improving, the ratio of the tensile values is clearly not a

mere difference in degree, but rather, a difference in kind that signifies patentability.

In the present case, in the absence of prior art at least suggesting the improvements of the present invention, the Pleyber declaration results clearly show patentability.

The rejection of claim 13 as over Noelle, in view of Brabant and Vuillaume as applied to claim 4, and further in view of US patent 3,853,651 to Porte ("Porte") is in error for the same reasons as set forth above. Porte is cited in respect to the speed relationship and therefore does not remedy the above deficiencies of the rejection. In any case, the Pleyber declaration provides the unexpected results acknowledged by the Examiner to overcome the rejection.

It is again urged that in the absence of any prior art teaching of the relationship between the air-permeability of a belt, consolidation of filaments and preservation of tensile ratio, the mere existence of stretching or like web processing techniques in the prior art can not be re-assembled in hindsight to meet or suggest the invention. There is no teaching in the prior art that the improvements of the present invention may be obtained by separating the spun-bonding and consolidation conveyor. More particularly, there is no teaching that transferring the

spun bond mat, prior to consolidation to a less air-permeable support, will enhance consolidation by preserving the tensile ratio and increasing the absolute tensile values. The Pleyber declaration shows the invention to achieve unexpected improvements and to be entitled to patent protection.

For all of the foregoing reasons, it is submitted that the rejection of the claims is overcome and claims 4-16 are in condition for allowance and such action is requested.

If there are any fees required by this Amendment, please charge the same to Deposit Account No. 16-0820, Order No. CAB-38032.

Respectfully submitted,

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